

## 12.4: Discussion

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### Discussion

Write a minimum one-page (12 font, single spaced) discussion on the experiment conducted this week. Address **at least one question in each category** as fully as possible integrating the collected data, providing explanations for the observed trends, and evaluating whether your original assumptions about the experiment were validated by the results. **The assignment will be graded on completeness, clarity of the explanations and the meaningful integration of the collected and calculated data.** Correct grammar and appropriate format for the chemical formulae and chemical reactions is expected.

1. (Existing knowledge, research, and views) Describe the components of an egg and indicate the main ingredient in each component.
2. (Interpretation) Using your balanced chemical equations that describes the observed reactions, interpret their meaning on the microscopic and macroscopic scale.
3. (Representation) Starting with the molecular equations, derive the total ionic and net ionic equations for each balanced chemical equation.
4. (Interpretation) Using your balanced chemical equations and your observations, identify the limiting reactant and excess reactant in each reaction.
5. (Experiment design) Provide an argument for letting the egg sit in the vinegar for 24 hours before replacing the vinegar. Suggest at least one method that would speed up the reaction.
6. (Experiment design) Provide an argument for removing the solution and adding fresh vinegar to the egg after 24 hours. Describe why this step was necessary and suggest an alternative to it.
7. (Experiment design) Provide a supported argument for using the sodium carbonate solution to precipitate the calcium and not sodium carbonate powder. (Hint: consider the definition of a precipitation reaction for this answer.)
8. (Analysis) If you didn't have sodium carbonate available, what other compounds could you have used to precipitate the calcium ions? (Hint: consider the solubility table.)
9. (Analysis) Describe the difference between the reaction of the whole egg and the cracked eggshells with vinegar. Provide at least one supported argument for the difference in the reactions.
10. (Analysis) Compare your grams of calcium carbonate collected from your individual eggshells. Provide at least one argument for the similarity and one argument for the observed differences.
11. (Assumptions and Limitations) Describe at least one assumption you make when calculating the amount of calcium from your eggshell. Identify at least two reasons from your experiment that make it impossible to determine the exact amount of calcium in the eggshell.
12. (Analysis) Compare the percent calcium of your eggshells with your group. Provide at least one argument that explains the similarity and one for the difference.
13. (Existing knowledge, research, and views) Birds are not the only species that lay eggs. Identify the main ingredient in those eggs and evaluate whether you could perform this experiment on those.
14. (Existing knowledge, research, and views) Calcium carbonate is a white powder, and yet the eggshells can have a variety of colors. Identify at least one cause for the variation in colors.
15. (Existing knowledge, research, and views) Calcium carbonate is commonly found in nature. List at least 3 materials, beyond eggshells that are made of calcium carbonate. Comment on the difference in their properties despite their similar composition.

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